



National Aeronautics and
Space Administration

Educational Product	
Educators	Grades 5-8

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EV-1999-01-018-HQ

1998-1999 NASA...On the Cutting Edge Educational Live Shows

Explorations in Science, Mathematics, and Technology for Pre-College Education



SMALL BODIES, BIG IMPACT

Program 1: **Cool Comets**

Live Broadcast: March 10, 1999

2:00 - 2:30 p.m. EST

Program 2: **Awesome Asteroids**

Live Broadcast: March 11, 1999

2:00 - 2:30 p.m. EST



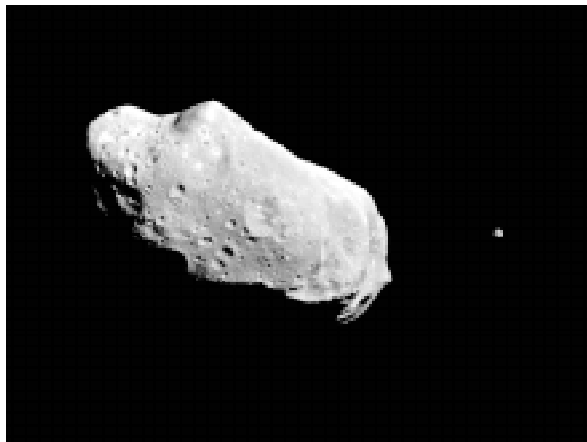
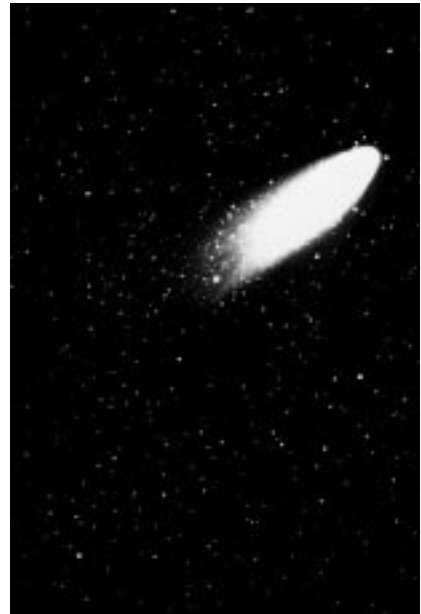
NASA... On the Cutting Edge is produced for NASA's Education Division by the **Teaching From Space Program** through **Oklahoma State University** (OSU) in cooperation with OSU's Educational Television Services, NASA Television, collaborating distance learning networks, and educational television providers.

SMALL BODIES, BIG IMPACT

COOL COMETS

March 10, 1999
2-2:30 p.m. EST

Comets are so cool, they're actually icy! As these cosmic snowballs approach the Sun, they turn into the beautiful celestial bodies we can see from Earth. Now, for the first time ever, a hi-tech NASA mission will capture comet dust samples and bring them back to Earth. The samples will give us new information about comets and help us understand the origins of our solar system. Take a journey with NASA into space as we explore the mysteries of comets and the secrets of our distant past.



AWESOME ASTEROIDS

March 11, 1999
2-2:30 p.m. EST

Asteroids get a lot of attention. It's no wonder - small ones continually pelt the Earth and a large one may have caused the extinction of the dinosaurs. But, that's just part of their story. Space missions to orbit and map a near-Earth asteroid for the first

time will help us discover more about these "minor planets," and could reveal clues about the formation of our solar system.... Get answers to your questions about asteroids directly from the scientists keeping tabs on them. And, see a sneak preview of NASA's exciting plans to put a rover on an asteroid!

For more information about this and future
NASA... On the Cutting Edge programs, please visit:
<http://www.okstate.edu/aesp/VC.html>

Featured NASA Scientists



Dr. Heidi B. Hammel is a Principal Research Scientist at the Massachusetts Institute of Technology (MIT) in the Department of Earth, Atmospheric, and Planetary Sciences. She works primarily in the field of outer planets. Her latest research has focused on imaging of Neptune and Uranus with Hubble Space Telescope. Dr. Hammel has been awarded prizes both for her research (most recently, the 1996 Urey Prize of the American Astronomical Society Division for Planetary Sciences) and for her public outreach (including the 1996 National Spirit of American Women Award and the Exploratorium's 1998 Public Understanding of Science Award).



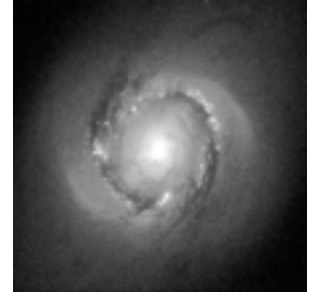
Dr. Don Yeomans is a Senior Research Scientist and Supervisor for the Solar System Dynamics Group at the Jet Propulsion Laboratory. Dr. Yeomans is the Project Scientist for the MUSES-CN mission to explore the surface of a near-Earth asteroid and Radio Science Team Chief for the Near-Earth Asteroid Rendezvous (NEAR) mission. He is the current Chair for the Division of Planetary Sciences and has recently been appointed manager of NASA's Near-Earth Object Program Office. His research work is focused upon the physical and dynamical modeling of comets and asteroids. He has been active in providing the observing community and flight projects with position predictions for hundreds of comets and asteroids including those that have been, or will be, mission targets. In refining the motions of comets and asteroids, he has used data types as diverse as recent

radar measurements, Hipparcos-based astrometry, and ancient Chinese observations. Don has received 10 NASA Achievement awards including an Exceptional Service Medal in 1986. He has published four books and over 100 technical papers. Asteroid 2956 was named 2956 YEOMANS to honor his professional achievements.

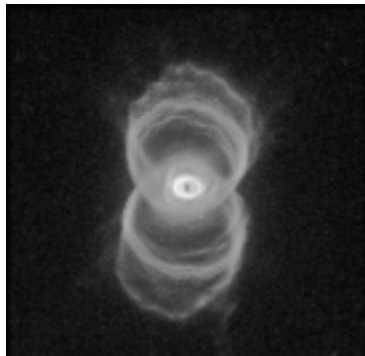
NASA... On the Cutting Edge would not be possible without the support and participation of educators, students, and members of the community.

NASA's Space Science Enterprise

Humans have a profound and distinguishing imperative to understand our origin, our existence, and our fate. For millennia, we have gazed at the sky, observed the motions of the Sun, Moon, planets, and stars, and wondered about the universe and the way we are connected to it. The Space Science Enterprise serves this human quest for knowledge. As it does so, it seeks to inspire our Nation and the world, to open young minds to broader perspectives on the future, and to bring home to every person on Earth the experience of exploring space.



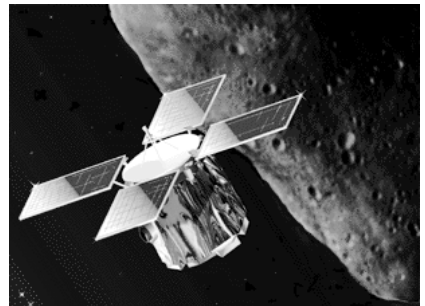
The mission of the Space Science Enterprise is to solve mysteries of the universe, explore the solar system, discover planets around other stars, search for life beyond Earth, and from origins to destiny, chart the evolution of the universe and understand its galaxies.



In accomplishing its mission, the Space Science Enterprise addresses most directly the following NASA fundamental questions:

- How did the universe, galaxies, stars, and planets form and evolve?
- How can our exploration of the universe and our solar system revolutionize our understanding of physics, chemistry, and biology?
- Does life in any form, however simple or complex, carbon-based or other, exist elsewhere than on planet Earth?
- Are there Earth-like planets beyond our solar system?

The strategy of the Enterprise is to conduct world-class research, to maximize the scientific yield from our current missions, and to develop and deploy new missions within the "faster, better, cheaper" framework of a revolutionized NASA.



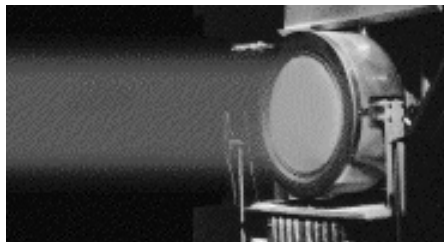
NASA's Space Science Enterprise

continued...

As a visible link to future human exploration beyond Earth orbit, Space Science Enterprise robotic missions help develop the scientific knowledge such ventures will need. At the same time, the Enterprise will benefit from the opportunities human exploration will offer to conduct scientific research that may stretch beyond the capabilities of robotic systems.



To achieve its long-term goal in science, the Enterprise will develop and bring to flight readiness revolutionary technologies in advanced miniaturization, intelligent systems, autonomous operations, and simulation-based design. We will bring the same spirit of innovation and change that embodies our flight programs to our Agency-wide responsibility to maintain a vigorous core program of cross-cutting technology development, especially in long-term, high-risk, high-payoff areas.

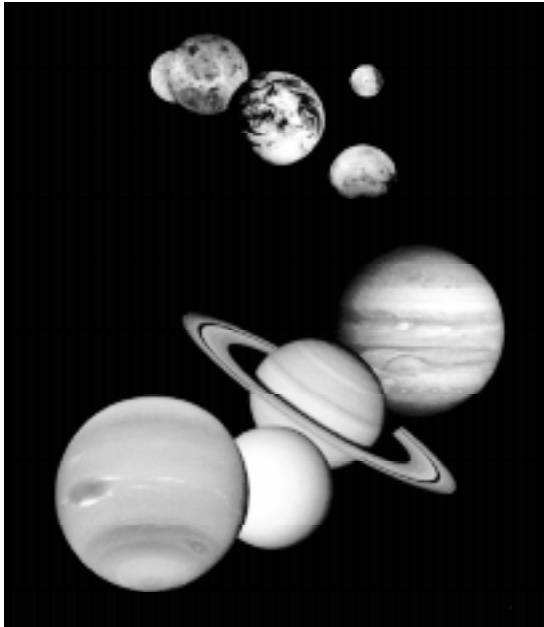


The public is both an investor in space science research and the ultimate customer and beneficiary. The Enterprise strives to serve the public by clearly communicating its research results and the excitement of space exploration. It supports educational organizations nationwide and seeks to apply the special talents of the space science community to educational improvement. It also strives to transfer technologies to the private sector and to develop strong and lasting partnerships among industry, academia, and Government so that the Nation reaps maximum scientific and economic benefits from its Space Science Program.

For more information about NASA's Space Science Enterprise, please visit:

<http://spacescience.nasa.gov/>

NASA Field Center Roles and Missions in Space Science

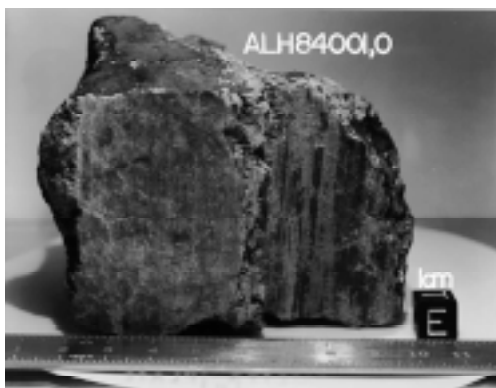
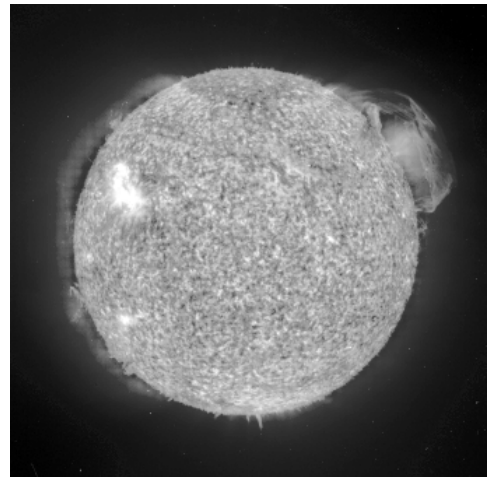


Jet Propulsion Laboratory

Planetary Science & Exploration
Deep Space Missions
Infrared Astronomy
Astrophysics
Space Physics
Scientific Research
New Millennium Technology
Demonstration Missions
Advance Technology Development

Goddard Space Flight Center

Astrophysics
Space Physics
Scientific Research
Advance Technology Development



Johnson Space Center

Astromaterials (meteorites)
Scientific Research

NASA Field Center Roles and Missions in Space Science

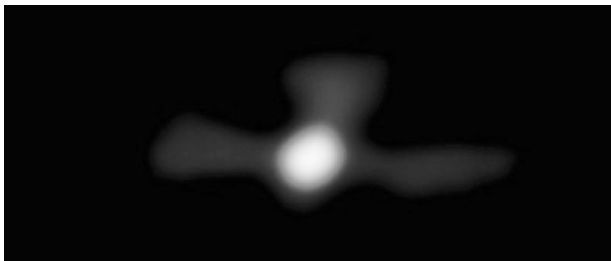
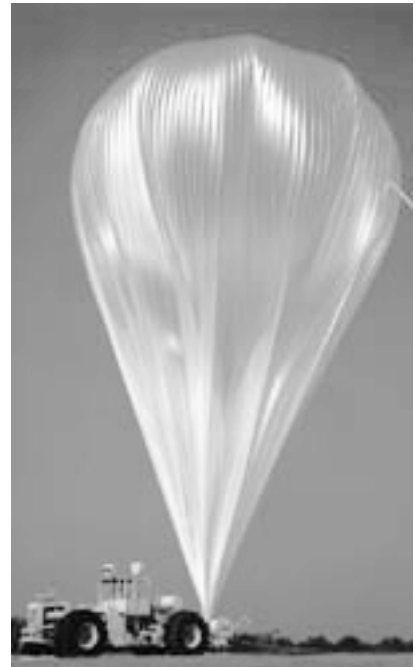


Ames Research Center

Astrobiology
Astrochemistry
Suborbital Astronomy
Scientific Research

Wallops Flight Facility

Sounding Rockets
Suborbital Balloons

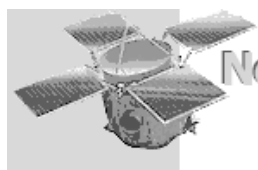


Marshall Space Flight Center

X-ray Astronomy
Scientific Research

Educational Resources

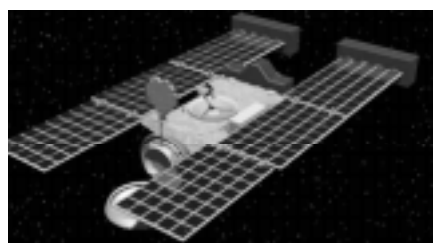
Office of Space Science Education/Public Outreach Resources:
<http://www.hq.nasa.gov/office/oss/education/edsites.htm>



Near Earth Asteroid Rendezvous

NEAR is the first spacecraft to orbit an asteroid, returning science data to answer fundamental questions about the origin and composition of asteroids, comets, and our solar system. For

more information about NEAR and NEAR-related educational resources, please visit the following: <http://near.jhuapl.edu/> and <http://near.jhuapl.edu/ed/index.html>



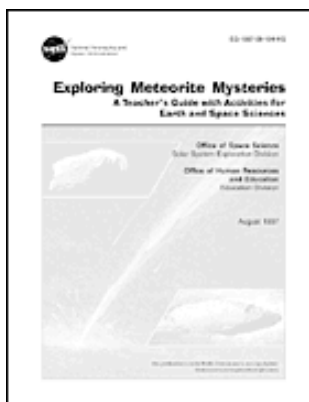
STARDUST is the space mission that will fly close to a comet and, for the first time ever, bring cometary material back to Earth for analysis by scientists worldwide. Stardust will be the first U.S. mission dedicated solely to a material from outside the orbit of the Moon. Its primary goal is to collect comet dust and volatile samples and also bring back samples of

interstellar dust including the recently discovered dust streaming into the solar system from the direction of Sagittarius. For more information about STARDUST and STARDUST-related educational resources, please visit the following: <http://stardust.jpl.nasa.gov/> and <http://stardust.jpl.nasa.gov/education/>



Deep Space 1 is the first in a series of deep space and Earth-orbiting missions that the New Millennium Program will conduct to demonstrate new technologies in a space-borne testbed. For more information about Deep Space 1 and Deep Space 1-related educational resources, please visit the following:

<http://nmp.jpl.nasa.gov/ds1/> and <http://nmp.jpl.nasa.gov/ds1/edu/index.html>



Exploring Meteorite Mysteries

An Educator's Guide With Activities for Earth and Space Sciences

Exploring Meteorite Mysteries

Slide Set With Script

The study of meteorites provides a unifying theme that links almost every aspect of Earth and planetary science with mathematics, physics, chemistry and even biology. Please visit NASA Spacelink at <http://spacelink.nasa.gov/products> to download this educator's guide with activities. The slide

set with script is also available at Spacelink or through NASA Central Operation of Resources for Educators (CORE): <http://spacelink.nasa.gov/CORE>

NASA...On The Cutting Edge Small Bodies, Big Impact

EDUCATOR REPLY CARD

Video Resource Guide

To achieve America's goals in Educational Excellence, it is NASA's mission to develop supplementary instructional materials and curricula in science, mathematics, geography, and technology. NASA seeks to involve the educational community in the development and improvement of these materials. Your evaluation and suggestions are vital to continually improving NASA educational materials.

Please take a moment to respond to the statements and questions below. You can submit your response through the Internet or by mail. Send your reply to the following Internet address:

http://ehb2.gsfc.nasa.gov/edcats/cutting_edge.html

You will then be asked to enter your data at the appropriate prompt.

Otherwise, please return the reply card by mail. Thank you.

1. With what grades did you use the video and video resource guide?

Number of Teachers/Faculty:

____ K-4 ____ 5-8 ____ 9-12 ____ Community College
College/University - ____ Undergraduate ____ Graduate

Number of Students:

____ K-4 ____ 5-8 ____ 9-12 ____ Community College
College/University - ____ Undergraduate ____ Graduate

Number of Others:

____ Administrators/Staff ____ Parents ____ Professional Groups
____ General Public ____ Civic Groups ____ Other

2. What is your home 5- or 9-digit zip code? _____

3. This is a valuable video and video resource guide.

☒ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree
Expect to apply what I learned in this video and video resource guide.

☒ Strongly Agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly Disagree

5. What kind of recommendation would you make to someone who asks about this video and video resource guide?

☐ Excellent ☐ Good ☐ Average ☐ Poor ☐ Very Poor

6. How did you use this video and video resource guide?

☐ Background Information ☐ Critical Thinking Tasks
☐ Demonstrate NASA Materials ☐ Demonstration
☐ Group Discussions ☐ Hands-On Activities
☐ Integration Into Existing Curricula ☐ Interdisciplinary Activity
☐ Lecture ☐ Science and Mathematics
☐ Team Activities ☐ Standards Integration
☐ Other: Please specify: _____

7. Where did you learn about this video and video resource guide?

☐ NASA Educator Resource Center
☐ NASA Central Operation of Resources for Educators (CORE)
☐ Institution/School System
☐ Fellow Educator
☐ Workshop/Conference
☐ Other: Please specify: _____

8. What features of this video and video resource guide did you find particularly helpful?

9. How can we make this video and video resource guide more effective for you?

10. Additional comments:

Today's Date: _____

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